

10 Nathan Law UIC Program		ROOM/STA. NO.																		
FROM Bob Reich Ca. Div. of Oil & Gas 1416 9th St. Sacramento Ca 95814																				
REPRESENTING 95814		ROOM/STA. NO. 1310																		
DATE 3/25/83	TIME	PHONE																		
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MESSAGE/REMARKS Note: The info on the two aquifers that have not been exempted. Regards, Bob																				

STD 7 (REV. 10-79) STATE OF CALIFORNIA  
 COMBINATION OF STD 7 AND 118 (ROUTE SLIP) ANNUAL SAVINGS \$8,300.

MESSAGE

OSP

# Memorandum

Bob Reid  
Sacramento

Date : March 7, 1983

Subject: UIC Extensions

RECEIVED  
DIVISION OF OIL AND GAS  
MAR 8 12 19 PM '83

Department of Conservation—  
Division of Oil and Gas

Place: Bakersfield

As requested by the Environmental Protection Agency, the District 4 office has reviewed the list of nonexempt aquifers under UIC regulations and wishes to request extension of the termination deadline for two of these zones to 18 months. In preparation of this request, we have researched the domestic water well usage and, with the aid of various oil operators involved, have received additional current information on the injection projects in these zones. This extension will enable us to collect and correlate data for possible exemption application at a later date.

1. Chanac zone, Kern River field: At present, 4 wells are permitted to inject water into this zone at depths between 1100' -1700'± (drill depth measurements). The total volume of fluid injected daily is approximately 41,210 barrels. Two of the wells do inject small (<1%) percentages of water softener brine (high only in chlorides) but, with the dilution factor, the TDS of the injected fluid does not exceed that of the Chanac zone. The other two wells inject only produced Kern River zone water, which is of a significantly better quality than the Chanac zone. Domestic water well data obtained from the Kern County Water Agency shows no wells within one mile from these injectors. Within 72 square miles of these four injection wells, K.C.W.A. (KCWA) records show 122 domestic wells. Of these, 17 are known to have been used within the past year (the reason for use is unknown). Thirty-one of these wells are either abandoned or have been idle for at least 3 years. The status of the remaining 74 is unknown. Depth measurements are known on 24 of these wells. Only 2 of these 24 are deeper than 1100', both have been idle for more than 14 years, and the closest of these two is at least 3 miles south-southeast of the injectors. In addition, we have been supplied with current chemical analyses of water being injected, as well as a letter from the operators describing the physical and financial hardships they would face should injection approval be rescinded. Copies of this information are attached. Based on this information, we feel that this injection interval warrants exempt status under the UIC program.
2. Kern River zone, Kern Bluff field: At present, the Division of Oil and Gas is allowing only one well to inject produced oilfield water into the Kern River zone in this field. Approximately 4000 barrels per day are disposed under vacuum into barren sands from 200' -350' below ground level. From January 1983 water analyses (copies attached) the injection water tests better in TDS than drinking water used in the area and better in all respects than the health standards for domestic use water. KCWA records show only two domestic

water wells within a 12-square-mile area surrounding this well. The status of these wells is unknown. Depth measurements were available on only one of the two wells located within the same section as the disposal well. These measurements show that the water producing interval (if currently utilized) is 55' below the deepest injection interval. The other water well is located at least  $\frac{1}{2}$  mile east of the injector. Attached is a letter from the operator stating the difficulties he would encounter should we rescind injection approval plus representative laboratory analyses of the injected water and local drinking water. It should be noted that the present zone of injection is barren sands and gravels and that the logical alternative to continued subsurface injection would be surface disposal.

Again, we submit this evidence in support of continued injection into these zones and ask that exemption status be given.

If you have any questions, please contact this office.

*David Mitchell*

David Mitchell  
Associate Oil and Gas Engineer

DM:tn

Attachments



**Chevron U.S.A. Inc.**

P. O. Box 5355, Bakersfield, CA 93388

March 4, 1983

**RECEIVED**

**MAR 4 1983**

**DIVISION OF OIL & GAS  
BAKERSFIELD**

C. D. Fiddler  
Division Manager  
Northern California Division  
Production Department

**KERN RIVER INJECTION  
WELL NO. 2-D, CHANAC ZONE**

Mr. A. G. Hluza  
Division of Oil and Gas  
4800 Stockdale Hwy., Suite 417  
Bakersfield, CA 93309

Attention: Mr. David Mitchell

Gentlemen:

Chevron U.S.A. Inc. is submitting the attached information in response to your correspondence of January 29, 1983. You requested we supply (1) a statement of hardship resulting from stopping injection into the subject well, and (2) water analyses of the current injection waters.

Eliminating injection at this well could under certain circumstances directly reduce our Kern River oil production by 1,000 barrels per day. It could also reduce or affect the Kern River production activities of Kaplan Oil Company, Star Oil Company, and Santa Fe Energy Company, and our total production. Chevron, West Coast, and Witco Refineries are also somewhat dependent on this well.

All of the above listed companies deliver waste water to the Chevron U.S.A. water plant for treatment and disposal. Normally, our water plant discharges cleaned produced water to the Beardsley Canal. Well No. 2-D is the only backup disposal for this canal discharge. This backup system is necessary at times when there is a plant upset or when a number of steam generators are down. The water plant is also used to treat steam generator feedwaters.

When plant upsets occur, this well is used to supplement water discharges. During these episodes, this well and on-site sumps allow the production and refining activities to proceed usually for a long enough period to restore the plant without adversely affecting any of the users. Without this well, shutdowns would be required of any or all users. These shutdowns would require that oil production be stopped.

As you know, any shutdown of producing wells results in a number of wells sanding up. These in turn require expensive and time-consuming workovers before production can be restored. The cost of such an event is difficult to determine.

A cost more easily determined is that of directly affecting production which could depend on this well. The injection rate of this well is 30,000 B/D. Assuming an average water to oil ratio of 30 to 1, elimination of the well would mean an oil production decrease of 1,000 B/D.

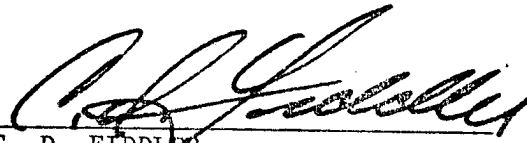
Also included are water analyses of water that would be injected. Analyses were made by both BC Laboratories (Attachment I) and our company laboratory (Attachment II). A water plant flow schematic is included with each set of analyses. Sample points A, B, and C are identified. Point B is the most representative as it is a combined stream of A and C.

As discussed with you, we have been unable to prove actual oil content in Chanac formation waters. Though we do believe the Chanac sand to be lower sand bodies of China Grade production sand. It is our belief that the Chanac sands most likely have some oil content and actually have continuity with China Grade production zones.

A review of DOG literature (see Attachment III) classifies the Chanac as undifferentiated. No known barrier is identified. We believe these zones to actually be the bottom of the China Grade sands.

We appreciate your effort in appealing the proposed ruling. We are continuing our search for data sources to provide support for the appeal. If there is any additional information you need in this matter, please contact Mr. D. O. Culbertson at (805) 393-1312.

Very truly yours,



C. D. FIDDLER

Attachments

CHEMICAL ANALYSIS

PETROLEUM



LABORATORIES INC

J. J. EGLIN REG. CHEM. ENGR.

3016 UNION AVE BAKERSFIELD, CALIFORNIA 93305 PHONE 324-1815

MAIN OFFICE 4100 PIERCE ROAD BAKERSFIELD CA 93308 PHONE 327-491

Chevron U.S.A., Inc.  
P. O. Box 5355  
Bakersfield, California 93388

Attention Mr. C. E. Fieber

Date Reported: 2/9/83  
Date Received: 2/3/83  
Laboratory No.: 1285 to 1290

P. O. #M-609575 PFOD

RECEIVED

MAR 4 1983

DIVISION OF OIL & GAS  
BAKERSFIELD

WATER ANALYSES

Sample Description

Oil & Grease, PPM

Kern River Water Reclamation Plant:

Pt. A 2/2/83 1300 hrs.  
Sample Pt. A 2/3/83

38.  
45.

Pt. B 2/2/83 1300 hrs.  
Sample Pt. B 2/3/83

36.  
36.

Pt. C 2/2/83 1300 hrs.  
Sample Pt. C 2/3/83

26.  
23.

B C LABORATORIES, INC.

BY

*J. J. Eglin*  
J. J. Eglin

cl

DATE OF REPORT 2/9/83  
 DATE OF SAMPLING 2/1/83  
 SAMPLED BY  
 LABORATORY NO. 1291  
 ANALYST

WELL NO. Kern River Water Reclamation Plant  
 COMPANY Chevron USA  
 FIELD  
 ZONE  
 SAMPLE SOURCE A

RADICALS		CONCENTRATION MILLIGRAMS PER LITER	REACTING VALUE EQUIVALENTS PER MILLION	REACTING VALUE PERCENT
SODIUM	Na	161.	7.00	36.68
CALCIUM	Ca	34.5	1.73	9.07
MAGNESIUM	Mg	5.4	0.44	2.31
BARIUM	Ba	(-) 1.		
STRONTIUM	Sr			
POTASSIUM	K	13.2	0.34	1.78
Iron	Fe	0.60	0.03	0.16
SULPHATE	SO <sub>4</sub>	44.	0.92	4.82
CHLORIDE	Cl	145.5	4.11	21.52
CARBONATE	CO <sub>3</sub>	0.		
BICARBONATE	HCO <sub>3</sub>	275.5	4.52	23.66
HYDROXIDE	OH			
IODIDE	I			
SILICA	SiO <sub>2</sub>	126.		
IRON, ALUMINA	Fe <sub>2</sub> O <sub>3</sub>			
TOTAL		806.	19.09	100.0

GROUP	CHEMICAL CHARACTER	MISCELLANEOUS
ALKALIS	PRIMARY SALINITY 52.68	BORON 1.6 Mg/LB
EARTHS	SECONDARY SALINITY -	HYDROGEN SULFIDE less than 0.1 ppm
STRONG ACIDS	PRIMARY ALKALINITY 24.24	EQUIVALENT SALT 508. Mg/LNaCl
WEAK ACIDS	SECONDARY ALKALINITY 23.08	RESISTIVITY @ 77°F 11.49 O.M.
Ca/EARTHS		CHLORINITY 240. Mg/LNaCl
Ca/Mg = 3.93	Total 100.0	SPECIFIC GRAVITY 1.000
CHLORIDE SALINITY	CARBONATE/CHLORIDE	pH 6.6
SULPHATE SALINITY		

REMARKS

Na+K

TICKELL GRAPH  
% REACTING VALUE

Ca+Mg+Ba+Sr

Note: The subject water contains 0.023 times the solids content of "normal sea water"

(-) refers to "less than".

X CO<sub>3</sub>  
HCO<sub>3</sub>  
OH

Cl+I+Br

ARC REPRESENTS "CONCENTRATION OF SOLIDS IN NORMAL SEA WATER"

SIGNED:

DATE OF REPORT 2/9/83  
 DATE OF SAMPLING 2/3/82  
 SAMPLED BY  
 LABORATORY NO. 1293  
 ANALYST

WELL NO. Kern River Water Reclamation Pla  
 COMPANY Chevron USA  
 FIELD  
 ZONE  
 SAMPLE SOURCE Sample Point A 1300 hrs.

RADICALS		CONCENTRATION MILLIGRAMS PER LITER	REACTING VALUE EQUIVALENTS PER MILLION	REACTING VALUE PERCENT
SODIUM	Na	192.	8.35	37.71
CALCIUM	Ca	37.	1.85	8.36
MAGNESIUM	Mg	5.9	0.49	2.21
BARIUM	Ba	(-) 1.		
STRONTIUM	Sr			
POTASSIUM	K	13.8	0.35	1.58
Iron	Fe	0.62	0.03	0.14
SULPHATE	SO <sub>4</sub>	43.	0.90	4.12
CHLORIDE	Cl	194.4	5.49	25.17
CARBONATE	CO <sub>3</sub>	0.		
BICARBONATE	HCO <sub>3</sub>	275.5	4.52	20.71
HYDROXIDE	OH			
IODIDE	I			
SILICA	SiO <sub>2</sub>	126.		
IRON, ALUMINA	Fe <sub>2</sub> O <sub>3</sub>			

TOTAL 888. 21.98 100.

GROUP	CHEMICAL CHARACTER	MISCELLANEOUS
ALKALIS	PRIMARY SALINITY 58.58	BORON 1.5 Mg/LB
EARTHS	SECONDARY SALINITY -	HYDROGEN SULFIDE less than 0.1 ppm
STRONG ACIDS	PRIMARY ALKALINITY 20.00	EQUIVALENT SALT 607 Mg/LNaCl
WEAK ACIDS	SECONDARY ALKALINITY 21.42	RESISTIVITY @ 77°F 9.62 O.M.
Ca/EARTHS		CHLORINITY 321. Mg/LNaCl
Ca/Mg = 3.78	Totals 100.0	SPECIFIC GRAVITY 1.000
CHLORIDE SALINITY	CARBONATE/CHLORIDE	pH 6.7
SULPHATE SALINITY		

REMARKS

Na+K

TICKELL GRAPH  
 REACTING VALUE

Ca+Mg+Ba+Sr

Note: The subject water contains 0.025 times  
 the solids content of "normal sea water".

(-) refers to "less than".

X CO<sub>3</sub>  
 HCO<sub>3</sub>  
 OH

CI+I+Br

ARC REPRESENTS "CONCENTRATION OF SOLIDS IN NORMAL SEA WATER"

SIGNED:



DATE OF REPORT 2/9/83  
DATE OF SAMPLING 2/2/83  
SAMPLED BY  
LABORATORY NO. 1292  
ANALYST

WELL NO. Kern River Water Reclamation Plan  
COMPANY: Chevron U.S.A.  
FIELD  
ZONE  
SAMPLE SOURCE Sample A 1300 hrs.

RADICALS		CONCENTRATION	REACTING VALUE	REACTING VALUE
		MILLIGRAMS PER LITER	EQUIVALENTS PER MILLION	PERCENT
SODIUM	Na	168.	7.30	37.26
CALCIUM	Ca	34.	1.70	8.67
MAGNESIUM	Mg	5.2	0.43	2.19
BARIUM	Ba	(-) 1.0		
STRONTIUM	Sr			
POTASSIUM	K	13.4	0.34	1.73
Iron	Fe	0.63	0.03	0.15
SULPHATE	SO <sub>4</sub>	41.	0.85	4.40
CHLORIDE	Cl	148.	4.18	21.64
CARBONATE	CO <sub>3</sub>	0.		
BICARBONATE	HCO <sub>3</sub>	282.4	4.63	23.96
HYDROXIDE	OH			
IODIDE	I			
SILICA	SiO <sub>2</sub>	128.		
IRON, ALUMINA	R <sub>2</sub> O <sub>3</sub>			
TOTAL		821.	19.46	100.

GROUP	CHEMICAL CHARACTER	MISCELLANEOUS
ALKALIS	PRIMARY SALINITY	52.08 BORON 1.7 Mg/LB
EARTHS	SECONDARY SALINITY	- HYDROGEN SULFIDE less than 0.1 ppm
STRONG ACIDS	PRIMARY ALKALINITY	25.90 EQUIVALENT SALT 526. Mg/LNaCl
WEAK ACIDS	SECONDARY ALKALINITY	22.02 RESISTIVITY @ 77°F 11.11 O.M.
Ca/EARTHS		CHLORINITY 244 Mg/LNaCl
Ca/Mg = 3.95	Totals	100. SPECIFIC GRAVITY 1.000
CHLORIDE SALINITY	CARBONATE/CHLORIDE	pH 6.7
SULPHATE SALINITY		

REMARKS

Na+K

TICKELL GRAPH  
REACTING VALUE

Ca+Mg+Ba+Sr

+

+

Note: The subject water contains 0.023 times  
the solids content of "normal sea water".

(-) refers to "less than".

X CO<sub>3</sub>  
HCO<sub>3</sub>  
OH

+

ARC REPRESENTS "CONCENTRATION OF SOLIDS IN NORMAL SEA WATER"

SIGNED: *J. J. Egle*

DATE OF REPORT 2/10/83  
 DATE OF SAMPLING 2/3/83  
 SAMPLED BY  
 LABORATORY NO. 1296  
 ANALYST

WELL NO. Kern River Water Reclamation Plant  
 COMPANY Chevron USA  
 FIELD  
 ZONE  
 SAMPLE SOURCE Sample Point B 1300 hrs.

RADICALS		CONCENTRATION MILLIGRAMS PER LITER	REACTING VALUE	REACTING VALUE
			EQUIVALENTS PER MILLION	PERCENT
SODIUM	Na	182.	7.91	37.36
CALCIUM	Ca	37.	1.85	8.73
MAGNESIUM	Mg	5.5	0.45	2.12
BARIUM	Ba	(-) 1.0		
STRONTIUM	Sr			
POTASSIUM	K	13.6	0.35	1.65
Iron	FE	0.62	0.03	0.14
SULPHATE	SO <sub>4</sub>	43.	0.90	4.24
CHLORIDE	Cl	187.3	5.29	24.90
CARBONATE	CO <sub>3</sub>	0.		
BICARBONATE	HCO <sub>3</sub>	270.3	4.43	20.86
HYDROXIDE	OH			
IODIDE	I			
SILICA	SiO <sub>2</sub>	126.		
IRON, ALUMINA	Fe <sub>2</sub> O <sub>3</sub>			
TOTAL		865.	21.21	100.

GROUP	CHEMICAL CHARACTER	MISCELLANEOUS
ALKALIS	PRIMARY SALINITY 58.28	BORON 1.4 Mg/LB
EARTHS	SECONDARY SALINITY -	HYDROGEN SULFIDE (-) 0.1 ppm
STRONG ACIDS	PRIMARY ALKALINITY 19.74	EQUIVALENT SALT 590. Mg/L NaCl
WEAK ACIDS	SECONDARY ALKALINITY 21.98	RESISTIVITY @ 77°F 9.90 O.M.
Ca/EARTHS		CHLORINITY 309. Mg/L NaCl
Ca/Mg = 4.11	Totals 100.0	SPECIFIC GRAVITY 1.000
CHLORIDE SALINITY	CARBONATE/CHLORIDE	pH 6.7
SULPHATE SALINITY		

REMARKS

Na+K

TICKELL GRAPH  
 REACTING VALUE

Ca+Mg+Ba+Sr

Note: The subject water contains 0.025 times the solids content of "normal sea water".

(-) refers to "less than".

X CO<sub>3</sub>  
 HCO<sub>3</sub>  
 OH

Cl+I+Br

ARC REPRESENTS "CONCENTRATION OF SOLIDS IN NORMAL SEA WATER"

SIGNED:

DATE OF REPORT	2/10/83	WELL NO.	Kern River Water Reclamation Plant
DATE OF SAMPLING	2/2/83	COMPANY	Chevron USA
SAMPLED BY		FIELD	
LABORATORY NO.	1295	ZONE	
ANALYST		SAMPLE SOURCE	Sample Point B 1300 hrs.

RADICALS		CONCENTRATION	REACTING VALUE	REACTING VALUE
		MILLIGRAMS PER LITER	EQUIVALENTS PER MILLION	PERCENT
SODIUM	Na	157.	6.83	37.08
CALCIUM	Ca	33.5	1.68	9.12
MAGNESIUM	Mg	4.	0.33	1.79
BARIUM	Ba	(-) 1.0		
STRONTIUM	Sr			
POTASSIUM	K	13.3	0.34	1.85
Iron	Fe	0.53	0.03	0.16
SULPHATE	SO <sub>4</sub>	46.	0.96	5.19
CHLORIDE	Cl	147.3	4.16	22.52
CARBONATE	CO <sub>3</sub>	0.		
BICARBONATE	HCO <sub>3</sub>	251.2	4.12	22.29
HYDROXIDE	OH			
IODIDE	I			
SILICA	SiO <sub>2</sub>	130.		
IRON, ALUMINA	Fe <sub>2</sub> O <sub>3</sub>			
TOTAL		783.	18.45	100.

GROUP	CHEMICAL CHARACTER	MISCELLANEOUS
ALKALIS	PRIMARY SALINITY 55.42	BORON 1.7 Mg/LB
EARTHS	SECONDARY SALINITY -	HYDROGEN SULFIDE less than 0.1 ppm
STRONG ACIDS	PRIMARY ALKALINITY 22.44	EQUIVALENT SALT 520. Mg/L NaCl
WEAK ACIDS	SECONDARY ALKALINITY 22.14	RESISTIVITY @ 77°F 11.24 O.M.
Ca/EARTHS		CHLORINITY 243. Mg/L NaCl
Ca/Mg = 5.09	Totals 100.	SPECIFIC GRAVITY 1.000
CHLORIDE SALINITY		pH 6.8
SULPHATE SALINITY	CARBONATE/CHLORIDE	

# REMARKS

Na+K

TICKELL GRAPH  
% REACTING VALUE

Ca+Mg+Ba+Sr

+

+

Note: The subject water contains 0.022 times the solids content of "normal sea water".

(-) refers to "less than".

X CO<sub>3</sub>  
HCO<sub>3</sub>  
OH

+

Cl+I+Br

+

SO<sub>4</sub>

ARC REPRESENTS "CONCENTRATION OF SOLIDS IN NORMAL SEA WATER"

SIGNED:

*J. J. Egan*

DATE OF REPORT 2/10/83  
 DATE OF SAMPLING  
 SAMPLED BY 2/1/83  
 LABORATORY NO. 1294  
 ANALYST

WELL NO. Kern River Water Reclamation Plant  
 COMPANY Chevron USA  
 FIELD  
 ZONE  
 SAMPLE SOURCE B

RADICALS		CONCENTRATION MILLIGRAMS PER LITER	REACTING VALUE EQUIVALENTS PER MILLION	REACTING VALUE PERCENT
SODIUM	Na	152.	6.61	37.42
CALCIUM	Ca	31.5	1.58	8.95
MAGNESIUM	Mg	3.4	0.28	1.59
BARIUM	Ba	(-) 1.0		
STRONTIUM	Sr			
POTASSIUM	K	13.	0.33	1.87
Iron	Fe	0.52	0.03	0.17
SULPHATE	SO <sub>4</sub>	45.	0.94	5.31
CHLORIDE	Cl	142.3	4.02	22.71
CARBONATE	CO <sub>3</sub>	0.		
BICARBONATE	HCO <sub>3</sub>	237.3	3.89	21.98
HYDROXIDE	OH			
IODIDE	I			
SILICA	SiO <sub>2</sub>	126.		
IRON, ALUMINA	Fe <sub>2</sub> O <sub>3</sub>			
TOTAL		751.	17.68	100.

GROUP	CHEMICAL CHARACTER	MISCELLANEOUS
ALKALIS	PRIMARY SALINITY 56.04	BORON 1.8 Mg/LB
EARTHS	SECONDARY SALINITY -	HYDROGEN SULFIDE less than 0.1 ppm
STRONG ACIDS	PRIMARY ALKALINITY 22.54	EQUIVALENT SALT 496. Mg/LNaCl
WEAK ACIDS	SECONDARY ALKALINITY 21.42	RESISTIVITY @ 77°F 11.76 O.M.
Ca/EARTHS		CHLORINITY 235. Mg/LNaCl
Ca/Mg = 5.62	Total 100.0	SPECIFIC GRAVITY 1.000
CHLORIDE SALINITY	CARBONATE/CHLORIDE	pH 6.7
SULPHATE SALINITY		

REMARKS

Na+K

TICKELL GRAPH  
% REACTING VALUE

Ca+Mg+Ba+Sr

+

+

Note: The subject water contains 0.021 times  
 the solids content of "normal sea water".

(-) refers to "less than".

X CO<sub>3</sub>  
HCO<sub>3</sub>  
OH

+

ARC REPRESENTS "CONCENTRATION OF SOLIDS IN NORMAL SEA WATER"

SIGNED: *J. J. Egle*

SAMPLED BY  
LABORATORY NO. 1297  
ANALYST

COMPANY Chevron USA  
FIELD  
ZONE  
SAMPLE SOURCE C

RADICALS		CONCENTRATION MILLIGRAMS PER LITER	REACTING VALUE EQUIVALENTS PER MILLION	REACTING VALUE PERCENT
SODIUM	Na	140.	6.09	36.86
CALCIUM	Ca	32.5	1.63	9.87
MAGNESIUM	Mg	2.5	0.21	1.27
BARIUM	Ba	(-) 1.0		
STRONTIUM	Sr			
POTASSIUM	K	12.5	0.32	1.94
Iron	Fe	0.23	0.01	0.06
SULPHATE	SO <sub>4</sub>	45.	0.94	5.72
CHLORIDE	Cl	135.9	3.84	23.36
CARBONATE	CO <sub>3</sub>	0.		
BICARBONATE	HCO <sub>3</sub>	209.6	3.44	20.92
HYDROXIDE	OH			
IODIDE	I			
SILICA	SiO <sub>2</sub>	121.		
IRON, ALUMINA	Fe <sub>2</sub> O <sub>3</sub>			
TOTAL		699.	16.48	100.

GROUP	CHEMICAL CHARACTER	MISCELLANEOUS
ALKALIS	PRIMARY SALINITY 58.16	BORON 1.9 Mg/LB
EARTHS	SECONDARY SALINITY -	HYDROGEN SULFIDE (-) 0.1 ppm
STRONG ACIDS	PRIMARY ALKALINITY 19.44	EQUIVALENT SALT 467. Mg/L NaCl
WEAK ACIDS	SECONDARY ALKALINITY 22.40	RESISTIVITY @ 77°F 12.50 O.M.
Ca/EARTHS	Totals 100.0	CHLORINITY 224. Mg/L NaCl
Ca/Mg = 7.76	CARBONATE/CHLORIDE	SPECIFIC GRAVITY 1.000
CHLORIDE SALINITY		pH 6.6
SULPHATE SALINITY		

REMARKS

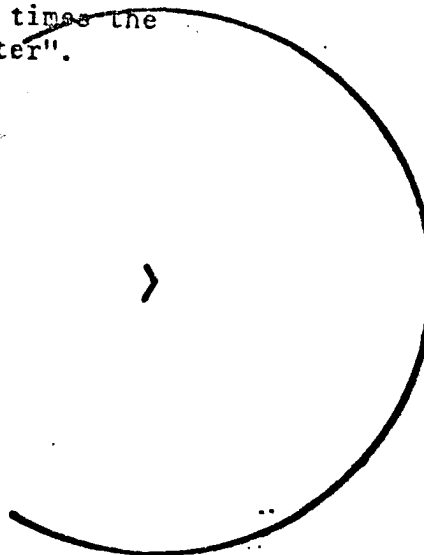
Na+K  
+

TICKELL GRAPH  
% REACTING VALUE

Ca+Mg+Ba+Sr  
+

Note: The subject water contains 0.020 times the solids content of "normal sea water".

(-) refers to "less than".



X CO<sub>3</sub>  
HCO<sub>3</sub>  
OH

+

+

ARC REPRESENTS "CONCENTRATION OF SOLIDS IN NORMAL SEA WATER"

SIGNED:

*J. J. Ely*

DATE OF REPORT 2/10/83  
DATE OF SAMPLING 2/3/82  
SAMPLED BY  
LABORATORY NO. 1299  
ANALYST

WELL NO. Kern River Water Reclamation Plant  
COMPANY Chevron USA  
FIELD  
ZONE  
SAMPLE SOURCE Sample Point C 1300 hrs.

RADICALS		CONCENTRATION MILLIGRAMS PER LITER	REACTING VALUE EQUIVALENTS PER MILLION	REACTING VALUE PERCENT
SODIUM	Na	142.	6.17	37.21
CALCIUM	Ca	31.5	1.58	9.53
MAGNESIUM	Mg	2.4	0.20	1.21
BARIUM	Ba	(-) 1.0		
STRONTIUM	Sr			
POTASSIUM	K	12.2	0.31	1.87
Iron	Fe	0.47	0.03	0.18
SULPHATE	SO <sub>4</sub>	45.	0.94	5.66
CHLORIDE	Cl	139.1	3.93	23.64
CARBONATE	CO <sub>3</sub>	0.		
BICARBONATE	HCO <sub>3</sub>	209.6	3.44	20.70
HYDROXIDE	OH			
IODIDE	I			
SILICA	SiO <sub>2</sub>	123.		
IRON, ALUMINA	R <sub>2</sub> O <sub>3</sub>			
TOTAL		582.	16.60	100.

GROUP	CHEMICAL CHARACTER	MISCELLANEOUS
ALKALIS	PRIMARY SALINITY 58.60	BORON 1.8 Mg/lb
EARTHS	SECONDARY SALINITY -	HYDROGEN SULFIDE (-) 0.1 ppm
STRONG ACIDS	PRIMARY ALKALINITY 19.56	EQUIVALENT SALT 473. Mg/L NaCl
WEAK ACIDS	SECONDARY ALKALINITY 21.84	RESISTIVITY @ 77°F 12.35 O.M.
Ca/EARTHS	Totals 100.0	CHLORINITY 230. Mg/L NaCl
Ca/Mg = 7.90	CARBONATE/CHLORIDE	SPECIFIC GRAVITY 1.000
CHLORIDE SALINITY		pH 6.6
SULPHATE SALINITY		

REMARKS

Na+K

TICKELL GRAPH  
% REACTING VALUE

Ca+Mg+Ba+Sr

+

+

Note: The subject water contains 0.017 times  
the solids content of "normal sea water".

(-) refers to "less than".

X CO<sub>3</sub>  
HCO<sub>3</sub>  
OH

CI+I+Br

SO<sub>4</sub>

ARC REPRESENTS "CONCENTRATION OF SOLIDS IN NORMAL SEA WATER"

SIGNED:

*J. J. B. B.*